

Original Research Article

Assessment of Susceptibility to Diabetes Mellitus among Rural Population using Indian Diabetic Risk Score - a Cross Sectional Study

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ABSTRACT

Introduction: The burden of diabetes mellitus is expected to increase by 58%, from 51 million people in 2010 to 87 million in 2030. In rural India the prevalence rate has increased from 1% to 4-10% over last 20 years. Indian Diabetic Risk Score is a cost-effective & simple method for identifying people with higher risk of development of Diabetes Mellitus. If the disease has not yet developed, then some interventions could be undertaken to reduce the modifiable risk factors.

Objectives: To assess the susceptibility to Diabetes Mellitus among rural population using Indian Diabetic Risk Score (IDRS)

Methodology: This community based cross-sectional study was carried out Agasga, the rural field practice area of Dept. of Community Medicine, among 855 adults aged between 30-60 years by using a predesigned & pretested schedule. Statistical analysis was done using percentages and Chi square test.

Results: Out of 855 participants 48.53% were males & 51.54% were females. 51.6% had moderate risk with IDRS 30-50, 36.3% had high risk IDRS ≥ 60 and 12.2% had low risk with IDRS <30. In Multiple Logistic Regression IDRS score was associated with gender, socioeconomic status, family type, Fasting blood sugar level, BMI with $p < 0.05$.

Conclusions: Our study showed even in rural area 1/3rd population is at higher risk of developing Diabetes Mellitus. Higher the risk score higher was the fasting blood sugar.

Implications: Early identification of risks will help in prevention and burden of disease.

Key words: Indian Diabetic Risk Score, Rural area, BMI, Multiple logistic regressions.

INTRODUCTION

The world today faces an epidemic of non communicable diseases (NCD), which will soon surpass communicable diseases both in developing and developed world. One among such diseases is Diabetes mellitus, which shows an 'iceberg phenomena'. The prevalence of diabetes is rising at an alarming rate. The International Diabetes Federation had estimated that in 2010 the global

population with diabetes between the ages of 20- 79 was 285 million (6.4%) and it had projected that this would grow to 439 million (7.7%) by 2030. ^[1] However the Diabetes Atlas, 6th edition figures shows that in 2013 there are 382 million people have diabetes in the world and by 2035 this will rise to 592 million. ^[2] Diabetes caused 5.1 million deaths in 2013; every six seconds a person dies from diabetes. ^[2] Diabetes caused at least 548 billion dollars

in health expenditure in 2013–11% of total spending on adults. [2] The number of people with type 2 diabetes is increasing in every country. 80% of people with diabetes live in low-and middle-income countries and the socially disadvantaged in any country are the most vulnerable to the disease. [1]

Numerous studies have been conducted to estimate the prevalence of diabetes mellitus among the urban population of India. [3,4] Very few data are available on the prevalence of diabetes mellitus among the rural population of India and so in Karnataka state. Data suggest that approximately 742 million people in India (70% of Indian population) live in rural area. [5] It certainly becomes very important to estimate the prevalence of diabetes in rural Indian population to design various strategies to tackle the battle against diabetes mellitus.

Several prospective studies have shown that measures of lifestyle modification help in preventing the onset of diabetes. Early identification of the high risk individuals would help in taking appropriate intervention in the form of dietary changes and increasing physical activity, thus helping to prevent or at least delay the onset of diabetes. This means that identification of at risk individuals is extremely important if we are to prevent Diabetes Mellitus. Recently, risk scores based on simple anthropometric and demographic variables i.e.; Indian Diabetes Risk Score (IDRS) has been devised which can be used to detect at risk population. [6] It is utmost important to create awareness among public about the risk factors of diabetes and thereby other non communicable diseases associated with it and reduce the associated mortality and morbidity. With this background the present study designed to measure the risk factors for DM, and also to assess future risk of DM, by using IDRS, among rural adults. The study findings will further help in developing preventive strategies.

Objectives: To assess the susceptibility to Diabetes Mellitus among rural population using Indian Diabetic Risk Score (IDRS).

MATERIALS AND METHODS

The present study was conducted at the Agasga village of Primary Health Center (PHC), Handignur which is a rural field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, Belgaum. The Handignur PHC has four sub-centers catering to 16 villages, having a total population of 27,509. The village is situated at a distance of 10 kilometers from Belgaum city towards South East.

Risk prediction: Based on the Indian Diabetes Risk Score [IDRS], [6] risk prediction for Diabetes Mellitus was done.

Sampling procedure

Study design: A cross sectional study.

c) Study period: One year -1st January, 2013 to 31st December, 2013.

d) Sample size: By taking prevalence of family history as 26 % (one of the risk factor for Diabetes Mellitus), [7] the sample size is calculated using the formula:

$$n = 4 p q / d^2$$

n → sample size

p → prevalence of family history [7] =26 %

q → (100-p)

d → absolute error = 3 %

Total sample (n) = 855

The total population of Agasga village is around 4000. As per voter's list the number of adults aged between 30 – 60 years residing in this area are approximately 1900. Sampling frame was prepared. With help of Standard Random number table, 855 participants were identified and included in the study.

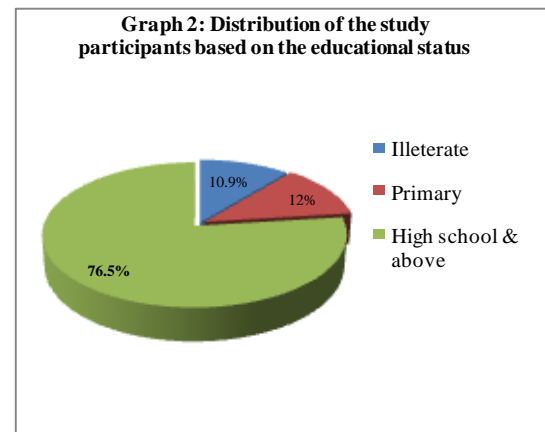
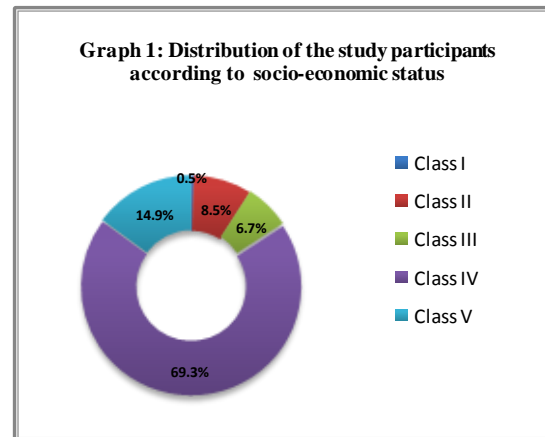
RESULTS

In our study, 150 (17.54 %) participants were between age group of 30 – 34 years, 425 (49.7 %) between 35 to 49 years, 280 (32.74%) between 50 to 60 years. Out of 855 study participants, 415 (48.53 %) were male and 440 (51.54 %) were female participants. In the present

study, 832 (97.3 %) were married, 7 (0.8 %) were unmarried and 16 (1.9 %) were widowed, all the 855 participants were Hindu by religion. In the study, 614 (71.8 %) of the participants were farmers, 144 (16.5%) were homemakers, 69 (8.1%) were coolies, 9(1.1%) were skilled workers, 7(0.8%) were having business, 5(0.6%) were in private (clerical) job, 3(0.4%) were government employees and 4 (0.5%) were unemployed.

Age (Years)		
30 -34	150	17.54
35 – 49	425	49.70
50-60	280	32.74
Gender		
Male	415	48.53
Female	440	51.54
Marital status		
Married	832	97.3
Unmarried	7	0.8
Widowed	16	1.9
Occupation		
Government employee	03	0.4
Non - government employee	05	0.6
Business	7	0.8
Skilled Worker	9	1.1
Farmer	614	71.8
Coolie	69	8.1
Homemaker	144	16.5
Unemployed	4	0.5
Family Type		
Nuclear	723	84.6
Joint	132	15.4
Socio economic status		
Class I	4	0.5
Class II	73	8.5
Class III	57	6.7
Class IV	593	69.3
Class V	128	14.9
Education		
Illiterate	93	10.9
Primary	103	12.0
Secondary and plus	659	77.1

In this study, 84.6% (723) of the population had Nuclear family, 15.4% (132) had Joint family type. As per modified B.G. Prasad’s classification, in the present study, 593 (69.3%) participants belonged to class IV SES, followed by 128(15%) to class V, 73 (8.5 %) in class II, 57(6.7 %) in class III, 132 (13.5%) and 4 (0.5 %) in class I. In the present study, 93(10.9) were illiterate, 103 (12.0%) studied up to primary school level, 659(77.1%) high school and above.

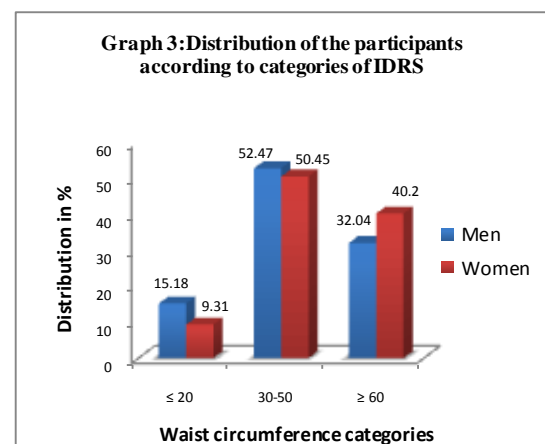


IDRS RISK PREDICTION

Table 1: Distribution of participants according to categories of IDRS (N = 855)

Risk Scores	Men (%)	Women (%)	Total (%)
<20(Low risk)	63(15.18)	41(9.31)	104(12.2)
30-50(Moderate risk)	219(52.77)	222(50.45)	441(51.6)
≥60(High risk)	133(32.04)	177(40.2)	310(36.3)
Total	415 (100)	440 (100)	855(100)

$\chi^2 = 10.197$ Df = 3 p =0.006



In our study, 12.2% of the participants were under low risk category,

51.56 % were in moderate risk category and 36.3% were at high risk category. In high risk category females were more than males. (40.2% vs. 32.04 %)

This gender wise difference in risk factors of diabetes was found to be statistically significant ($p = 0.006$).

DISCUSSION

In our study, the behavioural and biological risk factors measured were assessed and depending on the number of risk factors present among each individual they were further stratified into 3 groups according to Indian diabetic risk Scores. Risk < 20 as low risk, Risk 30 -50 as moderate risk and >60 as High risk. 12.2%, 51.6 % and 36.3 % respectively had low, moderate and high risk factors when compared to men. Women were having more risk factors when compared to men.

A study conducted in rural Tamil Nadu showed that 18.66 % had high risk, 50 % had moderate risk and 31.34 % had low risk by IDRS. [8] In a similar study conducted at Chennai by Mohan *et al.* 43% of the population were found in high risk category. [3]

A community based cross sectional study was conducted among 250 undiagnosed diabetic people aged ≥ 20 years in rural area of Kolkata .IDRS component, socio demographic factors and various anthropometric measurements were considered. 49.2 % were in moderate risk; 31.5% had high risk and 22.6% had low risk. [9]

CONCLUSION

Our study showed even in rural area 1/3rd population is at higher risk of developing Diabetes Mellitus. Higher the risk score higher was the fasting blood sugar.

This study estimates the usefulness of simplified Indian diabetes risk score for identifying high risk diabetic subjects in the community. This simplified diabetes risk score has categorized the risk factors

based on their severity. Use of the IDRS can make mass screening for diabetes in India more cost effective.

Implications: Early identification of risks will help in prevention and burden of disease.

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